



COMPARATIVE ANALYSIS OF KEY PERFORMANCE INDICATORS OF ISLAMIC INDEX

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Abstract

Islamic index in general is the stock exchange index that includes stocks traded in the national and international market, the companies operating in accordance with Islamic law. First in 1990, it was introduced in the US Wall Street Stock Exchange. Islamic indices have a great importance to be able to measure the stock performance of companies operating in accordance with Islamic principles. In this study Standard and Poor's, Dow Jones, Morgan Stanley, and the Financial Times Stock Exchange Islamic Indices have been included in the study on a monthly frequency and to compare the performance beta values are estimated by creating the index single index model. In the study using the Capital Asset Pricing Models (CAPM), expected return for indices were estimated. In addition, to compare portfolio performance Sharpe Ratio, Treynor Ratio, Jensen Performance Ratio is calculated.

Keywords: Islamic indices; CAPM; Sharpe; Treynor; Jensen.

JEL Classification: C22; G12; G15.

İSLAMİ ENDEKSLERİN TEMEL PERFORMANS GÖSTERGELERİYLE KARŞILAŞTIRMALI ANALİZİ

Özet

Genel olarak İslami endeks, ulusal ve uluslararası pazarda işlem gören İslami kurallara göre faaliyet gösteren şirketlerin hisse senetlerini içeren borsa endeksidir. İlk olarak 1990 yılında, ABD Wall Street Borsası'nda tanıtılmıştır. İslami endeksler İslami esaslara uygun olarak faaliyet gösteren firmaların hisse senedi performansını ölçmek için büyük önem taşımaktadır. Bu çalışmada, Standard and Poor, Dow Jones, Morgan Stanley ve Financial Times Borsası İslami Endeksleri aylık frekansta çalışmaya dahil edilmiş ve performanslarını karşılaştırmak için tekli endeks modeli oluşturularak beta değerleri tahmin edilmiştir. Çalışmada Finansal Varlıkları Fiyatlandırma Modeli (CAPM) kullanılarak, endeksler için beklenen getiri tahmin edilmiştir. Buna ek olarak, portföy performanslarını karşılaştırmak için Sharpe Oranı, Treynor Oranını karşılaştırmak için, Jensen Performans Oranı hesaplanmıştır.

Anahtar Kelimeler: İslami endeksler; CAPM; Sharpe; Treynor; Jensen.

JEL Sınıflaması: C22; G12; G15.

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I. Introduction

Islamic index or halal index is a securities market index including national and international stock exchange shares of companies generally operating in accordance with the Islamic rules. The goal of Islamic Index' on individual level is to enable Muslim Investors to gain "interest-free capital" which is not contradicting with their believes, comfortably benefit from financial investment instruments and make investments. Riba or interest cause wealth for one party at the expense of another one which is unjustified conflicts with the welfare of the society¹.

Islamic investment, which based on Shariah principles, has forbidden activities with elements of usury (riba), gambling (maisir), and ambiguity (gharar). In addition there are forbidden activities like producing products or services that are not appropriate for Islamic teaching². "According to the *Shariah*, *Riba* technically refers to the "premium" that must be paid by the borrower to the lender along with the principal amount as a condition for the loan or for an extension in the duration of loan"³. On the other hand *Gharar* or risk forms the other side of the dilemma. "The literal meaning of the word *gharar* is fraud (*al-khida*)", but in transactions the word has often been used to mean risk, uncertainty and hazard"⁴.

It was first started to apply in American Wall Street Stock Exchange in 1990. Today there are securities market indexes compliant with Islamic rules in biggest stock exchanges of the world. Stock exchange investment funds including the stock shares in the Islamic indexes are called Islamic Investment Fund. Stock shares in Islamic Indexes are selected within the direction of Islamic Banking principles that are international accepted. The companies operating in the field of interest based finance, service, trade (banking, insurance, leasing, factoring etc.) alcoholic beverages, gambling (game of chance), foods such as pork meat, press, publication, advertisement, tourism, entertainment, tobacco products, weapon, forward gold-silver and foreign currency trade are not included into this index.

Islamic indexes are very important to measure stock share performance of companies operating pursuant to these principles and constitute basis for the new products to be developed in this field. Index dependent investment funds provide the Investors the chance of safe and easy investment. Also considering the decrease in dividend yields and interest rates, Islamic investment funds provide an alternative investment opportunity for Investors who would like to use their savings in stock exchange. Islamic investment may cause additional screening and monitoring costs. The selected criterias may cause less firms to get into the indices availability and have an advers affect on portfolio performance.

¹ Muhammad Taqi Usmani, "An introduction to Islamic finance" **The Netherlands: Kluwer Law International**, 2002, p.2.

² Securities Commission, List of Securities Approved by the Shari'ah Advisory Council of the Securities Commission" **Securities Commission**, Kuala Lumpur, 24 October 2002.

³ Zamir Iqbal and Abbas Mirakhor, **An introduction to Islamic finance: theory and practice**. Singapore: John Wiley & Sons (Asia) Pte Ltd., 2007, p.56.

⁴ Mohammad Hashim Kamali, **Islamic commercial law: an analysis of futures and options**. Cambridge: The Islamic Text Society, 2000, p.86.

Interest free loans given by Muslim merchants to stimulate the growth of the trade during middle ages may be shown as first Islamic Finance practices. The basis of today's Islamic Finance is based on 1960s. First Islamic Bank, Mit Gharm was founded in Egypt, in 1963 based on profit sharing principle. Another very important development for Islamic Finance is the foundation of Islamic Development Bank in Saudi Arabia in 1975. Financial activities of Islamic Banks have been developed with insurance activities. First Islamic insurance company was founded in Soudan in 1979. Following development of banking and insurance, Islamic capital market was formed and short and long-term debt instruments compliant with the rules of sharia were started to import. Islamic bonds issued by Malaysian Government in the year of 1983 are the first capital market instruments with this quality. As it shall be mentioned later again, Islamic stock shares and Islamic funds were started to develop.

Upon 2008 crisis affecting the world, searches have started for new systems, financial products and services in money and capital markets. "Islamic Finance" is one of these alternative systems applied as an exit way from crisis. Islamic Finance has lately become common in Europe and America. The system provides investment instruments compliant with Islamic rules within the direction of demands of Investors in the Islamic countries increasing their prosperity especially with the oil prices. Islamic Finance is divided into Islamic banking, insurance and capital market.

Islamic Economy and Finance are appreciated not only in Islamic Countries but also in the whole world. Today Islamic finance assets correspond to 1% of global finance assets. Islamic finance industry has shown a stable growth since 2000 and it is projected that this growth shall continue. The surveys conducted have shown that half of 1,6 billion Muslim worldwide shall prefer Islamic finance if it may perform a competitive structure against traditional services⁵. Islamic finance assets have reached to 1,3 trillion USD in 2011 with the yearly 19% compound growth rate obtained over 386 billion USD asset value in 2006. It became 1,8 trillion at the end of 2013 and 2 trillion at the end of 2014⁶.

In formation of modern Islamic finance system, traditional trade and financing methods of Islam and corporations and products of traditional (interest) system have been combined. Firstly, Islamic banks were founded and tekaful (Islamic insurance) and capital market instruments followed later. Although Islamic finance industry today has made a big progress, it cannot be said today that it has reached to a full maturity with all its compounds.

Surely there are some reasons behind this quick development of Islamic finance in modern period, as its short 50 years history has shown. We may list these reasons as⁷.

⁵ Mathieu Vasseux. (2009). The Next Chapter in Islamic Finance, Oliver Wyman, http://www.oliverwyman.com/pdf_files/OW_En_FS_PUBL_2009_IslamicFinance.pdf; 17.06.2015.

⁶ Ernst&Young, **The World Islamic Banking Competitiveness Report**, 2012-2013, p.4.

⁷ Bala Shanmugam and Zaha Rina Zahari, "A Primer on Islamic Finance ",The Research Foundation of CFA Institute, 2009, p. 10.

- a) Continuous economic growth of Gulf Region; increase of wealth in the region upon growth of investment opportunities,
- b) Alternative system searches due to the shortcomings in the current system,
- c) Upon global finance crisis, breakdown of the trust in traditional banking and finance structure,
- d) Global adoption of Islamic instruments by Investors,
- e) Arrangements in Europe and America covering Islamic finance system and global players' providing Islamic finance services.

In addition to these ⁸;

- In Islamic finance practices, price/value should be clear and known by parties,
- Product/service subject of the sale should be present,
- The ownership of the goods should be possible and held by the seller,
- The product should be allowed to be purchased-sold, used and had a value compliant with the Islamic law,
- The delivery should be physically performed and the ownership should be by default transferred to the other party.

2. Islamic Indices

Upon revelation of legitimacy of stock shares screening, Islamic indexes have been started to publish. The first Islamic stock share index was published by RHB Unit Trust Management in Malaysia on May 1996. "Dow Jones Islamic Market (DJIM) Index" published by Dow Johns & Company on February, 1999, "Kuala Lumpur Sharia Index" published by Bursa Malaysia on April, 1999 and "FTSE Global Islamic Index Series" published by FTSE Group on October 1999 followed later. Since 2006, Standard & Poors has published indexes in different categories under the title "Shari'a Compliant Index" such as "the S&P 500 Sharia Index", "the S&P Europe 350 Sharia Index", and "the S&P Japan 500 Sharia Index", "S&P/IFCI Large-MidCap Sharia". Another group is "the MSCI Islamic Index Series"⁹.

⁸ Muhammed Ayup, **Understanding Islamic Finance**, John Wiley and Sons Pub., England, 2007.

⁹ Mansur Mannan and Credit Suisse. "Islamic Capital Markets, Islamic Finance: A Guide for International Business and Investment", Consultant Editor: Roderick Millar Editor: Habiba Anwar, **GMB Publishing**, United Kingdom and United States of America, 2008, p. 115.

Table 2. 1: Criteria of Islamic Indices

Screening Criteria	Dow Jones Islamic Market Index	FTSE Islamic Index	MSCI Global Islamic Indices	S&P Islamic Index
Business activities screening.	Excludes companies involved in:	Excludes companies involved in:	Excludes companies that are directly involved in, or derive 5% or more of their revenue from:	Excludes companies involved in:
	Alcohol;	Interest bearing investments;	Alcohol;	Alcohol;
	Tobacco;	Forward currency transactions;	Tobacco;	Tobacco;
	Pork-related products;	Manufacture or distribution of alcohol or tobacco products;	Pork-related products;	Pork-related products;
	Conventional financial services (banking, insurance etc.);	Gaming or gambling;	Financial services;	Financial services;
	Weapon and defence;	Manufacture or distribution of weapons and defence-related products;	Defence/Weapons	Advertising and Media
	Entertainment (hotels, casinos/gambling, cinema, pornography, music etc.).	Pork-related products;	Gambling/Casino; Music;	Gambling/Casino;
	Conventional banking, insurance and other interest-based financial services;	Hotels;	Pornography	
	Pornographic materials;	Cinema;	Trading of gold and silver as cash on differed basis	
		Adult entertainment		
Benchmarks for a mix between both permissible and non-permissible activities, or based on the financial ratios screening.	Exclude companies that have more than:	Exclude companies that have more than:	Exclude companies that have more than:	Exclude companies that have more than:
	33% of Total Debt divided by Trailing 12-month Average	33% debt to total asset ratio;	33.33% total debt over total assets;	%33 debt to market value of equity(12 month average)
	33% of Total Cash and Interest Bearing Securities divided by Trailing 12-month Average	33% cash and interest bearing accounts (liquid instruments like CDs);	33.33% sum of cash and interest-bearing securities over total assets;	%49 accounts receivables/ market value of equity(12 month average)
	45% of Accounts Receivables divided by Total Assets.	50% receivables and cash;	33.33% sum of accounts receivables and cash over total assets.	%33 (cash+interest bearing securities)/market value of equity(12 month average)
	5% total interest and non-compliant activities income.		%5 non-permissible income other than interest income(12 month average)	

Source: Abd-Mohd and S&P Shariah Index Methodology

Index is mainly calculated with 3 different methods: equiponderant method, price-weighted method and market value-weighted method.

In equiponderant method, the calculation is made assuming investment was made equal to each stock share. In price-weighted method, companies are weighted according to their market prices. In this method, the weight of company with higher price is bigger. In market value-weighted method, companies are weighted according to their market value/ public market value and this is the most commonly used calculation method.

2.1. Dow Jones Islamic Market Index

Dow Jones index covers not only over 130.000 stock shares in 65 countries but also other instruments such as security with fixed interest, hedge fund, investment trusts and real estate investment trusts. The value of investment instruments subject to this index is around 2,1 trillion \$ as of 2009. It is possible to analyze Dow Jones index in three main parts: “Indicator” and “Blue Chip” and “Special” indexes issued for a certain target.

Dow Jones Islamic Market Indexes take the stock shares determined by Sharia Commission under Dow Jones as basis. There are 24 indexes as blue chip, regional and industrial in this group where stock shares of 69 countries including Turkey. The stock shares such as alcohol, cigarette, gambling, pork products, defense industry and entertainment industries like hotel, cinema are excluded from these indexes. Moreover, total debt/market value and total cash and interest based securities/market value ratios should not be over 33%. The index is weighted according to the public market values¹⁰.

2.2. Financial Times Stock Exchange Sharia Global Stock Share Index

FTSE, Global Stock Share Index Series (GEIS) include over 8.000 stock shares from 48 countries. Stock shares under this series represent 98% of the total market value. FTSE Global Stock shares Index covering all these stock shares is included in this series. FTSE Sharia Global Stock Share Index series includes the companies operating in accordance with the sharia principles. The FTSE Shariah Global Equity Index Series has been designed to use as the basis of Shariah compliant investment products that meet the requirements of Islamic investors globally. Using the Large and Mid Cap stocks from the FTSE Global Equity Index Series as a base universe, constituents are then screened against a clear set of Shariah principles¹¹.

2.3. Standard and Poor's World Islamic Index

Standard and Poor's, another widely adopted index company on international arena was founded in 1906 under the name Standard Statistics Bureau in order to provide information on USA

¹⁰ Dow Jones Indices, “Guide to the Dow Jones Islamic Market Indexes”, A CME Group Company, US, August 2011, p. 2.

¹¹ FTSE, “FTSE Shariah Global Equity Index Series”, London, September 2015, p.1.

stock shares. Starting to form its first index in 1920, the company became the first company to form market value-weighted index in 1990s. S&P continues its activities under McGraw-Hill Companies Group since 1966.

Market value of products under S&P indexes, which are over 200 in terms of number, is around \$4,5 trillion. S&P provides not only index calculation but also services such as credit rating, research report preparation, investment counseling.

2.4. Morgan Stanley Capital International World Islamic Index

An international investment bank, Morgan Stanley (big partner) and another international finance corporate Capital Group International founded Morgan Stanley Capital International Inc. (MSCI) Company in order to operate in the field of index calculation. MSCI purchased Barra Group, a risk analysis company in 2004 and enlarged its service area.

Under the indexes created by the company called MSCI-Barra are already over 12.000 stock shares from 70 countries, products such as real estate investment trust, hedge fund. It is estimated the value of securities included into the index is around \$ 3 trillion.

MSCI Barra, a leading global provider of benchmark indices and risk management analytics products, announced today that it has launched a global family of Islamic indices designed to reflect Sharia investment principles while retaining replicability for international investors. Importantly, the MSCI Global Islamic Indices will incorporate dividend purification rules, resulting in more relevant benchmarks for Sharia portfolios¹².

3. Literature Review

Hakim and Rashidian¹³ are the pioneers to measure the risk of Islamic investments referred to as the “Islamic Beta.” Their findings also suggest that the Islamic index presents unique risk-return characteristics, an observation reflected in a risk profile significantly different from the Wilshire 5000. This result shows the fact that the Wilshire 5000 index is considerably more diversified than the Islamic index.

Another study which examines the Islamic index yet takes an approach that is totally different from all of the above methodologies is the study of Al-Zoubi and Maghyereh (2007)¹⁴. They apply the RiskMetrics, Student-t APARCH and skewed Student-t APARCH measures of risk on data from the DJIM index for the period 1996 to 2005. Results show that the DJIM is less risky than the benchmark.

¹² MSCI Islamic Index Series Methodology, “Index Methodology, MSCI Islamic Index Series”, US, March 2014, p.2.

¹³ Sam Hakim and Manochehr Rashidian, “Risk and return of Islamic stock market indexes” **Proceedings of the international seminar of nonbank financial institutions: Islamic alternatives**. Kuala Lumpur, Malaysia, 2004.

¹⁴ Haitham A. Al-Zoubi, and Maghyereh, Aktham I. “The relative performance of Islamic finance: a new guide to less risky investments” **International Journal of Theoretical and Applied Finance**. 10(2), 2006 pp. 235-249.

Khamlichi et al.¹⁵ searched the efficiency of MSCI and FTSE Islamic indices and their potential for diversification in comparison with the conventional benchmarks. They investigated if the series are co-integrated or not. Their results show that Islamic indices have the same level of efficiency as conventional ones; the indices of MSCI and FTSE families are the less inefficient. In terms of co-integration analysis, Islamic indices of Dow Jones and S&P have no co-integrating relations with their respective benchmarks, which suggest the existence of long-run diversification opportunities.

Hussein¹⁶ (2005) examined the impact of the Shariah screening on the performance of FTSE Global Islamic index and Dow Jones Islamic Market Index (DJIMI) by dividing the sample period into bull and bear market periods. He found that the Islamic indices have positive abnormal returns in the first bull market period, but in the bear market period the Islamic indices underperform the Dow Jones World Index and FTSE All-World index. Also Islamic indices fail to sustain their better performance over the second bull market periods since the counterpart indices achieve higher returns.

Hashim¹⁷ (2008) in his study considered the above dilemma by examining the effect of adopting screening rules on stock indices risk. He used monthly data from FTSE Global Islamic and tested the hypothesis that the Islamic index yields adequate returns for the level of risk undertaken. As a result Islamic index moved in line with the market and surpasses the socially responsible index in performance.

Hassan¹⁸ examined market efficiency and the time-varying risk return relationship for the Dow Jones Islamic Index over the 1996-2000 period. As a result returns showed that DJIM index returns are efficient. Hassan also investigated if there has been a calendar anomaly in DJIM but he didn't find an anomaly for any time. With GARCH model he examined the volatility of DJIM equity index returns and as a result he found significant positive relationship between conditional volatility and DJIM equity index returns

Hussein¹⁹ (2004) examined the impact of the ethical screening on the performance of FTSE Global Islamic index using a number of performance measurement techniques. Also investigated if the shares in the FTSE Global Islamic index are significantly different from their index

¹⁵ Abdelbari El Khamlichi, Kabir Sarkar, Mohamed Arouri, Frédéric Teulon, "Are Islamic Equity Indices More Efficient Than Their Conventional Counterparts? Evidence From Major Global Index Families", **The Journal of Applied Business Research**, July/August 2014, 30(4).

¹⁶ Khaled A Hussein, "Islamic Investment: Evidence from Dow Jones and FTSE Indices", **6th International Conference on Islamic Economics and Banking**, Jakarta, Indonesia, November 2005.

¹⁷ Noor Hashim, "The FTSE Global Islamic and the Risk Dilemma", **AIUB Bus Econ Working Paper Series, No 2008-08**, <http://orp.aiub.edu/WorkingPaper/WorkingPaper.aspx?year=2008>, 23.04. 2015.

¹⁸ Kabir Hassan, "Risk, Return and Volatility of Faith-Based Investing: The Case of the Dow Jones Islamic Index", **Proceedings of the Fifth Harvard University Forum on Islamic Finance: Dynamics and Development Cambridge**, Massachusetts. Center for Middle Eastern Studies, Harvard University, 2000, pp.43-67.

¹⁹ Khaled A Hussein, (2004). "Ethical Investment: Empirical Evidence From FTSE Islamic Index", **Islamic Economic Studies** 12(1).

counterpart or not. He found that application of shariah principles doesn't have an adverse effect on the Islamic index performance of FTSE. Also he found that Islamic indices perform similarly with its' counterpart over the period.

4. Purpose and Scope of the Study

The focal point of this study is the performance evaluation of the Islamic indices as from the standpoint of the portfolio management. The expected return on investment against the risk-taking attitude of the investor aims to reveal clearly. When reviewing the status of the investors, disclosure of the investment process, it is necessary to estimate the movement emerged during the investment fund.

Main purpose of the study is to apply the portfolio theory to the Islamic indices and comparative analysis of the performance of Islamic indices. Two immediate implications emerge from our study. Our findings (1) help investors to measure and compare the performance of the most popular Islamic indices; (2) draw attention of market players to consider interest rates and market return in their investment decisions.

5. Methodology and Data

In the first stage of the the study stability of the series was tested with Augmented Dickey-Fuller (ADF) and Phillips-Peron unit root tests in order to calculate the beta coefficients via Single Index Model. In the second stage, beta coefficient of Islamic indices is used in order to calculate Capital Asset Pricing Model (CAPM). Furthermore in order to compare performance of Islamic indices Sharpe Ratio, Treynor Ratio and The Jensen Performance Index are calculated. Data collected from Bloomberg and E-views 7 was used to estimate the models and equations.

The data used in this study;

*sp*_t; S&P 100 Pan Islamic Market Index

*ftse*_t; FTSE Global Islamic Index

*miwo*_t; Morgan Stanley MSCI World Islamic Index

*djim*_t; The Dow Jones Islamic Market World Index

*libor*_t; London Interbank Offered Rate

We present the detailed definitions of variables in Appendix A.

The formula for calculating the return series of Islamic indices;

$$R_i = \log(X_t / X_{t-1})100 \quad (1)$$

is used. Also at the beginning of the stock's names "R" indicates the logarithmic return of series.

Data for the period August 2007 and May 2015 have been used for The Dow Jones Islamic Market World Index Morgan Stanley MSCI World Islamic Index. Data for FTSE Global Islamic Index include between 2007 August and 2008 June. S&P 100 Pan Islamic Market Index data includes 2008 December and 2012 August.

The benchmark index is chosen to be the Morgan Stanley MSCI world Islamic Index as based on literature. (Hashim 2008) The index provides a better benchmark and representation of the market.

We used *libor* as a risk free rate. London Interbank Offered Rate is the average interest rate at which leading banks borrow funds of a sizeable amount from other banks in the London market. *Libor* is the most widely used “benchmark” or reference rate for short-term interest rates.

Table 5.1: Descriptive Statistics

	Rsp	Rftse	Rdjim	Rmiwo	libor
Mean	1.120	-1.609	0.278	0.196	0.957153
Median	1.723	-0.324	0.821	0.697	0.308950
Maximum	14.284	6.664	10.711	10.591	5.493940
Minimum	-9.130	-11.836	-20.124	-18.798	0.226090
Std. Dev.	5.064	5.517	5.098	4.944	1.354354
Skewness	-0.672	-45.035	-101.193	-97.410	2.105717
Kurtosis	301.528	239.079	529.317	495.979	6.344436
Probability	99.962	78.166	0.000	0.000	0.000

The logarithmic returns of the series are indicated in Table 5.1 indicates that the mean values are positive except ‘Rftse’. Furthermore, normal distribution of the entire series is observed, except ‘Rsp’ and ‘Rftse’.

5.1. Stationary Test of Variables

In order to test the stability of the variables is tested with Augmented Dickey-Fuller (ADF) and Phillips-Peron unit root tests. In the first stage of the work variables stability investigated with the Augmented Dickey-Fuller (ADF) and Phillips-Peron (PP) tests. According to Dickey and Fuller (1981), it is assumed that error terms are white noise, i.e. have sequential independence, normal distribution and fixed variance. On the other hand, Phillips and Peron (1988), contrary to Dickey and Fuller (1981), allow low interdependence and heterogeneity among the error terms. The ADF and PP test results are shown in Table 3.

Test equations are used:

$$\Delta Y_t = \gamma Y_{t-1} + \sum_{i=1}^p (\delta_i \Delta Y_{t-i}) + e_t \tag{2}$$

$$\Delta Y_t = \alpha + \gamma Y_{t-1} + \sum_{i=1}^p (\delta_i \Delta Y_{t-i}) + e_t \tag{3}$$

$$\Delta Y_t = \alpha + \beta t + \gamma Y_{t-1} + \sum_{i=1}^p (\delta_i \Delta Y_{t-i}) + e_t \tag{4}$$

Table 5. 2: Unit Root Test of Variables

ADF Unit Root Test						
	Intercept		Intercept and Trend		None	
Variable	Test Statistic	Prob.	Test Statistic	Prob.	Test Statistic	Prob.
<i>Rdjim</i> _t	-8.00	0.00	-8.12	0.00	-8.04	0.00
<i>Rspt</i> _t	-5.09	0.00	-6.03	0.00	-4.85	0.00
<i>libort</i> _t	-4.13	0.00	-3.04	0.13	-4.63	0.00
<i>Rmiwo</i> _t	-8.18	0.00	-8.27	0.00	-8.22	0.00
Phillips-Perron Unit Root Test						
	Intercept		Intercept and Trend		None	
Variable	Test Statistic	Prob.	Test Statistic	Prob.	Test Statistic	Prob.
<i>Rdjim</i> _t	-8.04	0.00	-8.13	0.00	-8.07	0.00
<i>Rspt</i> _t	-5.06	0.00	-5.43	0.00	-4.83	0.00
<i>libort</i> _t	-5.39	0.00	-3.33	0.07	-6.24	0.00
<i>Rmiwo</i> _t	-8.22	0.00	-8.30	0.00	-8.26	0.00

*Lag length (p) established using the Schwarz Information Criteria (SIC). The value minimizing SIC was taken as the optimum lag length.

As presented in Table 5.2 all return series used in the study are stationary, therefore, the difference series has not been studied.

5.2. Capital Asset Pricing Model (CAPM)

CAPM was developed by William Sharpe (1964) and John Lintner (1965) with their independent study of each other, but also contributed almost in the same period by Mossin, Treynor and many other scientists. CAPM refers to a model that defines the relationship between risk and expected return and is used in the pricing of risky securities; for pricing an individual portfolio or security. The capital asset pricing model decomposes a portfolio's risk into systematic and specific risk. Systematic risk is the risk of holding the market portfolio, as the market moves the individual asset is affected as well. Specific (idiosyncratic, diversifiable) risk is the unique risk to an individual asset and is not related to the market development.

CAPM was estimated in two stages. In the first step using the logarithmic returns of the indices ('Rsp_t', 'Rftse_t' and 'Rdjim_t') regressed to 'miwo_t'.

$$R_i = \alpha_i + \beta_i R_m + \varepsilon_t \quad t = 1, 2, \dots, n \tag{5}$$

R_i ; The return on Islamic index i during the period t,

ε_t ; It is the error term of the portfolio risk and indicates the unsystematic risk that can be eliminated through well diversification.

In the second step, (5) estimated value of the single index model of the systematic risk of β explanatory variables substituted into the equation (6) the expected return was estimated for each Islamic index.

The logarithmic returns of the series are indicated in Table 2 shows that the mean values are positive except 'Rftse'. Furthermore, a normal distribution of the entire series is observed, except 'Rsp' and 'Rftse'.

$$E(R_i) = R_f + \beta_i (E(R_m) - R_f) \tag{6}$$

$E(R_i)$; is the expected return of the Islamic indices

R_f ; is the risk-free rate

R_m ; is the expected return of the market

β_i ; is the sensitivity of the expected excess index returns to the expected excess market returns, or also;

$$\beta = \frac{Cov(R_i, R_m)}{\sigma^2(R_m)} \tag{7}$$

Table 5.3: Results of Single Index Model

	BETA	t-Statistic	Prob.	R-squared	Schwarz Cr.
R_{djim}_t	1.02	84.06	0.00	0.99	-7.39
R_{sp}_t	0.80	10.17	0.00	0.71	-4.22
R_{ftse}_t	1.02	9.52	0.00	0.92	-5.38

As presented in Table 5.3 beta coefficients of Dow Jones Islamic index has almost market risk and return. S&P 100 Pan Islamic Market Index has relatively lower level of risk and return to the market. Beta coefficient was determined significant for both models.

As results of single index model The Dow Jones Islamic Market World Index model has highest coefficient of r- squared.

5.3. Estimation of Expected Rate of Return

One of the goals to use CAPM is estimating the expected return. Using the formula (6) above, expected returns are estimated and listed in Table 5.

Table 5.4: Expected returns of Islamic Indices

Index	$E(R_i R_i)$
R_{djim}_t	0.1980306
R_{sp}_t	0.6093943
R_{ftse}_t	0.054826

S&P 100 Pan Islamic Market Index has highest expected return and the least is FTSE Global Islamic Index as seen in Table 5.4.

5.4. Measuring Performance of the Portfolio

Portfolio performance is determined by comparing the measured risk and return. To measure the return on a portfolio shortly, total return generated from capital appreciation in holding period and dividends are divided by the investment amount. However, only the measurement of the average return of a portfolio is not sufficient to determine the performance, risk adjusted return should be calculated.

In this study three Portfolios performance measurement used adjusted to the risk methods have been developed;

- The Sharp Ratio (Sharp, 1966)
- The Treynor Ratio (Treynor, 1965)
- The Jensen Performance Index (Jensen, 1968)

“All three indices are based on the capital asset pricing model and they are in widespread use. The Jensen Index is a measure of relative performance based on the security market line, whereas the Treynor and Sharp indices are based on the ratio of the return to risk. It is generally assumed in the Jensen and Treynor Indices that stock are priced according to the capital asset pricing model.”²⁰.

5.5.1. The Sharpe Ratio

Sharpe ratio is the excess expected return of an investment to its return volatility or standard deviation²¹. It is based on the Markowitz mean–variance portfolio theory, which proposes that a portfolio can be described by just two measures: its mean and its standard deviation of returns. The Sharpe ratio measures only one dimension of risk: the variance. The meaning of a high Sharpe ratio; the return of a fund compared to volatility level means high.

To calculate the Sharpe ratio in this study the following formula is used:

$$Sharpe = \frac{r_p - r_f}{\sigma_p} \quad (8)$$

r_p ; Average return

r_f ; risk free average return

σ_p ; Standard deviation

A high Sharpe ratio indicates well performance, whereas a low ratio shows a weak performance. As shown in Table 5.5 based on the risk FTSE Global Islamic Index has the highest performance.

Table 5.5: Sharpe Ratio Results

	Mean	Risk Free Rate	Standard Deviation	Sharpe Ratio
Rdjimt;	0.278	0.080	0.051	3.894
Rsppt	1.119	0.041	0.051	21.299
Rftset	-0.064	0.334	0.048	-8.235

S&P 100 Pan Islamic Market Index has highest Sharpe ratio which indicates well performance and FTSE Global Islamic Index has least in consistency with the beta coefficient results. The Dow Jones Islamic Market World Index has the relatively better performance than S&P 100 Pan Islamic Market Index.

²⁰ Muhammad Shahid, “Measuring Portfolio Performance”, *U.U.D.M. Project Report*, 19, 2007, p.19.

²¹ William Sharpe, “Mutual Fund Performance”, *Journal of Business*, 39, 1966, 119-138.

5.5.2. The Treynor Ratio

Treynor index also developed to measure the performance of the portfolio has the same quality with the Sharpe ratio basis²². However, instead of the standard deviation of the total risk indicators to measure the risk of Treynor portfolio, Treynor has chosen the systematic risk indicator beta coefficient. The main difference between Treynor and Sharpe, Treynor considers the systemic risk. The height of the Treynor ratio, it is emphasized that positively reviewed in terms of fund performance²³.

To calculate the Treynor ratio in this study the following formula is used:

$$Treynor = \frac{r_p - r_m}{\beta_{pm}} \quad (9)$$

r_p ; Average return

r_m ; Risk free average return

β_{pm} ; Beta

Table 5.6: Treynor Ratio Results

	Mean of The Return	Risk Free Rate	Beta	Treynor Ratio
Rdjimt;	0.278	0.080	1.025	0.194
Rsptt	1.119	0.041	0.805	1.340
Rftset	-0.064	0.334	1.022	-0.390

When the result evaluated in this respect, S&P 100 Pan Islamic Market Index provide additional return while increase the risks undertaken by portfolio. As it's seen in table 5.6 FTSE Global Islamic Index has the lowest Treynor ration consistency with the beta coefficient results.

5.5.3. The Jensen Performance Index

Sharpe and Treynor's index model based on risk portfolio allows the relative performance ranking. Jensen is, instead of taking into account the relative performance measure, developed absolute performance measure by considering risk²⁴. In other words, Jensen has developed a

²² Jack L. Treynor, "How to Rate Management of Investment Funds", *Harvard Business Review*, Vol.43, 1965, pp.63-75.

²³ Martin Eling and Frank Schuhmacher, "Does the choice of performance measure influence the evaluation of hedge funds?", *Journal of Banking and Finance*, 31, 2007, p.2633.

²⁴ Michael C. Jensen, "The Performance of Mutual Funds in the Period of 1945-1964", *Journal of Finance*, Vol. 23, pp.389-419.

set of standards for the performance of the portfolio performance measurement criteria, which measures the deviation from Security Market Line, and actually known as “Jensen alpha,” focuses on the subject of risk measurement²⁵.

To calculate the Jensen alpha in this study the following formula is used:

$$\alpha_i = R_i - [R_f + \beta_i(R_m) - R_f] \quad (10)$$

R_i ; Mean of the return

R_f ; Risk free rate

R_m ; Market Return

Table 5.7: The Jensen Performance Index Results

	Mean of the Return	Risk Free Rate	Beta	Market Return	Jensen
R_{djim}_t	0.278	0.080	1.025	0.196	0.080
R_{spt}_t	1.119	0.041	0.805	0.752	0.507
R_{ftse}_t	-0.064	0.334	1.022	0.060	-0.119

Alpha is the difference between average return with the expected return. A portfolio with a positive alpha, takes place over the security market line. It gives high return more than it should be in a given systematic risk. So in table 5.7 S&P 100 Pan Islamic Market Index and Dow Jones Islamic market World Index higher return with positive alpha.

6. Conclusion

The aim of this paper is to investigate returns of three Islamic indices and compare the performance of these indices. This paper attempts to answer the question whether these indices offer an opportunity for portfolio diversification or not and whether they moved together in the similar periods or not. In order to answer these questions this paper analyzes three pairs of global Islamic indices covering the most important index families; The Dow Jones Islamic Market World Index, FTSE Global Islamic Index, S&P 100 Pan Islamic Market Index. Referring to literature, it has seen that Morgan Stanley World Islamic Index used as indicator index, therefore this index

²⁵ Martin Eling and Frank Schuhmacher, “Does the choice of performance measure influence the evaluation of hedge funds?”, *Journal of Banking and Finance*, 31, 2007, p.2633.

was used as a market return in to estimate CAPM. Our statistical results on their risk and returns, measured by CAPM, Sharpe, Jensen, Treynor performance criteria.

Since these three indices have different screening criteria they might have differences in returns. Two immediate implications emerge from our study. Our findings (1) help investors to measure and compare the performance of the most popular Islamic indices; (2) draw attention of market players to consider interest rates and market return in their investment decisions. In terms of portfolio management, if the Islamic index has more screening criteria about the financial statement of firms, it could provide less affected than the unsystematic risk.

The results can be summarized as follows when the empirical analysis results are considered. The ADF and Phillips-Perron unit root test results show that all variables are stationary in their logarithmic returns except Libor. According to four performance criteria (CAPM, Sharpe, Treynor, Jensen) S&P Islamic index has the highest return and FTSE has the lowest. When we consider the betas of the indices, the results indicate that The Dow Jones Islamic and FTSE Islamic index have the same betas with 1.02 and higher risk than the S&P Islamic index. Although S&P has a lower risk, it offers higher return for the investors. That can be deriving from S&P has less screening business activities but more screening criteria for financial ratios. We concluded that further financial criteria which are screening in S&P Islamic index, makes the index less risky.

Our study contributes to the literature by take attention to two main shortages. Initially, we estimate the expected return of the Islamic indices and compare with the market return. We used three different portfolio performance measurements to compare the return performances of the Islamic indices. As referring to the literature, most of the studies focus on co-integration of Islamic indices. With this study we have offered to the investors the comparative analysis of Islamic indices performance.

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Appendix A: Definition of the Series

sp_i; EIIB100T Index DES S&P 100 Pan Islamic Market Index Index is comprised of the top 100 companies in specified countries according to market capitalization, subject to S&P sharia selection criteria. Regions included in the index Islamic countries: GCC, Egypt, Indonesia, Jordan, Kazakhstan, Lebanon, Malaysia, Morocco, Pakistan, Tunisia, Turkey.

ftse_i; FTSE TII Global Islamic GBP

From the 30th June 2008, this index will no longer be priced by FTSE. FTSE Global Islamic Index Series (GIIS) are equity benchmark indices designed to track the performance of leading publicly traded companies whose activities are consistent with Islamic Sharia principles.

miwo_i; The MSCI world Islamic Index is a free float weighted equity index. It was developed with a base value of 1000 as of may 31 2007.

djim_i; The Dow Jones Islamic Market World Index is a global index of companies that meet Islamic investment guidelines. The Index is quoted in USD.

Appendix B: Logarithmic Returns of Islamic Indices

